

EXHIBIT 448

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OHIO
EASTERN DIVISION

| | | |
|---------------------|---|---------------------|
| IN RE NATIONAL | : | MDL No. 2804 |
| PRESCRIPTION OPIATE | : | CASE NO. 17-MD-2804 |
| LITIGATION | : | (DAP) |
| | : | |

EXPERT REPORT OF CRAIG J. MCCANN, PH.D., CFA
March 25, 2019

A. State Hydrocodone and Oxycodone MME Per Capita,
1997-2017

Opioid Total Dosage Units by Company in Cuyahoga County, OH

| | | | | | | | | | |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| County Population | 1,312,816 | 1,301,540 | 1,291,479 | 1,285,082 | 1,278,200 | 1,270,461 | 1,266,210 | 1,264,622 | 1,262,459 |
| Total Dosage Units | 37,603,976 | 42,134,648 | 45,520,023 | 50,063,789 | 52,553,390 | 55,504,213 | 53,027,680 | 50,879,094 | 48,415,782 |

| Company Name | Market Share | Total Dosage Units | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------------------------------------|---------------------|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Cardinal Health | 23.07% | 100,530,754 | 11,456,136 | 12,083,744 | 12,735,624 | 13,500,846 | 11,629,054 | 10,459,812 | 9,693,602 | 10,156,709 | 8,815,227 |
| AmerisourceBergen Drug | 22.11% | 96,350,751 | 5,379,970 | 6,322,476 | 6,611,595 | 7,566,230 | 11,211,446 | 11,963,171 | 11,874,145 | 15,665,292 | 19,756,426 |
| Walgreen Co | 17.02% | 74,159,470 | 7,797,545 | 8,390,005 | 9,271,285 | 10,154,030 | 10,892,180 | 11,763,855 | 10,249,335 | 4,741,915 | 899,320 |
| McKesson Corporation | 14.32% | 62,375,571 | 4,554,354 | 5,775,078 | 6,936,936 | 7,335,571 | 6,098,059 | 7,764,769 | 8,001,665 | 7,675,533 | 8,233,606 |
| CVS | 9.61% | 41,859,800 | 3,607,600 | 4,480,400 | 4,666,100 | 5,009,400 | 5,013,800 | 5,363,800 | 5,379,400 | 4,991,900 | 3,347,400 |
| Discount Drug Mart | 2.75% | 11,981,350 | 1,059,900 | 1,237,900 | 1,273,000 | 1,426,420 | 1,445,800 | 1,436,350 | 1,418,750 | 1,384,620 | 1,298,610 |
| HBC Service Company | 2.53% | 11,008,220 | 0 | 0 | 0 | 345,720 | 2,187,700 | 2,554,850 | 2,384,350 | 2,110,400 | 1,425,200 |
| Rite Aid | 2.32% | 10,119,510 | 1,646,000 | 1,962,100 | 1,894,200 | 1,264,220 | 1,162,350 | 718,190 | 590,150 | 565,500 | 316,800 |
| Wal-Mart | 2.17% | 9,438,765 | 636,615 | 822,675 | 1,031,505 | 1,207,630 | 1,286,300 | 1,232,700 | 1,109,690 | 881,005 | 1,230,645 |
| Eckerd Corporation | 1.17% | 5,077,810 | 0 | 0 | 0 | 553,820 | 687,320 | 1,119,820 | 1,114,130 | 1,032,080 | 570,640 |
| Anda, Inc | 0.81% | 3,511,080 | 174,550 | 173,585 | 236,145 | 276,540 | 87,295 | 268,460 | 284,630 | 721,160 | 1,288,715 |
| Prescription Supply Inc | 0.68% | 2,957,844 | 617,806 | 566,349 | 548,848 | 606,151 | 85,565 | 138,754 | 175,439 | 98,982 | 119,950 |
| H. D. Smith | 0.56% | 2,431,410 | 21,100 | 21,850 | 28,273 | 199,648 | 386,405 | 323,894 | 490,089 | 447,963 | 512,188 |
| The Harvard Drug Group | 0.14% | 599,885 | 126,800 | 147,800 | 119,200 | 130,675 | 16,405 | 34,605 | 17,600 | 6,800 | 0 |
| KeySource Medical | 0.11% | 498,415 | 7,000 | 27,890 | 29,300 | 231,665 | 152,440 | 50,120 | 0 | 0 | 0 |
| Amneal Pharmaceuticals LLC | 0.09% | 390,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 390,000 |
| Safecor Health, LLC | 0.09% | 382,201 | 0 | 0 | 0 | 0 | 0 | 99 | 28,691 | 290,074 | 63,337 |
| River City Pharma | 0.08% | 366,805 | 1,000 | 0 | 2,500 | 94,700 | 64,805 | 145,100 | 51,700 | 2,800 | 4,200 |
| American Sales Company | 0.06% | 240,200 | 240,200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Henry Schein Inc | 0.05% | 211,660 | 36,245 | 27,160 | 28,700 | 23,430 | 14,170 | 30,425 | 22,400 | 16,240 | 12,890 |
| Smith Drug Company | 0.04% | 169,002 | 0 | 2,000 | 10,300 | 22,520 | 33,502 | 31,600 | 25,205 | 27,535 | 16,340 |
| Dispensing Solutions | 0.04% | 164,990 | 0 | 0 | 0 | 19,825 | 32,790 | 47,325 | 40,260 | 24,790 | 0 |
| Miami-Luken | 0.02% | 72,985 | 71,185 | 1,600 | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| Pharmacy Service Ctr Distr | 0.02% | 71,235 | 16,605 | 13,700 | 13,815 | 13,815 | 11,900 | 1,400 | 0 | 0 | 0 |
| Quest Pharmaceuticals Inc | 0.02% | 68,740 | 0 | 0 | 4,900 | 15,700 | 4,520 | 10,000 | 30,115 | 3,505 | 0 |
| Darby Dental Supply, LLC | 0.02% | 68,500 | 47,900 | 6,000 | 8,100 | 2,400 | 2,000 | 1,000 | 200 | 500 | 400 |
| DRx Pharmaceutical Consultants, Ir | 0.01% | 62,966 | 20,409 | 17,382 | 16,035 | 9,140 | 0 | 0 | 0 | 0 | 0 |
| Value Drug Co | 0.01% | 47,373 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47,373 |
| Top Rx, Inc. | 0.01% | 42,930 | 2,000 | 2,500 | 5,200 | 8,030 | 2,000 | 10,700 | 10,500 | 1,000 | 1,000 |
| Rebel Distributors Corp | 0.01% | 34,585 | 7,630 | 3,200 | 8,345 | 5,230 | 4,905 | 3,495 | 1,780 | 0 | 0 |
| Moore Medical LLC | 0.01% | 34,024 | 6,400 | 3,600 | 0 | 6,200 | 5,500 | 5,700 | 3,224 | 2,000 | 1,400 |
| PSS World Medical Inc | 0.01% | 32,240 | 5,725 | 6,910 | 6,205 | 4,900 | 4,200 | 3,000 | 1,300 | 0 | 0 |
| PD-Rx Pharmaceuticals Inc | 0.01% | 30,560 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,200 | 27,360 |
| General Injectables & Vaccines, Inc | 0.01% | 29,500 | 6,400 | 7,300 | 8,500 | 7,300 | 0 | 0 | 0 | 0 | 0 |
| A F Hauser, Inc | 0.01% | 25,500 | 3,600 | 6,800 | 7,200 | 100 | 0 | 100 | 2,000 | 3,200 | 2,500 |
| Capital Wholesale Drug & Co | 0.00% | 21,400 | 0 | 1,000 | 3,000 | 500 | 0 | 0 | 0 | 2,000 | 14,900 |
| Professional Veterinary | 0.00% | 16,900 | 700 | 3,400 | 6,000 | 5,100 | 1,700 | 0 | 0 | 0 | 0 |
| MWI Veterinary Supply | 0.00% | 16,510 | 0 | 100 | 100 | 1,400 | 2,380 | 3,730 | 3,790 | 2,645 | 2,365 |
| Columbus Serum Co | 0.00% | 15,800 | 8,100 | 6,000 | 0 | 1,600 | 100 | 0 | 0 | 0 | 0 |
| Midwest Veterinary Supply Inc | 0.00% | 15,510 | 2,000 | 1,400 | 0 | 0 | 500 | 4,045 | 2,565 | 2,200 | 2,800 |

Opioid Total Dosage Units by Company in Summit County, OH

| | | | County Population | 544,660 | 544,275 | 543,116 | 542,135 | 541,648 | 541,293 | 540,716 | 541,601 | 542,095 |
|--------------------------------------|--------------|--------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | | | Total Dosage Units | 22,554,858 | 25,912,698 | 26,980,193 | 29,797,825 | 31,878,533 | 33,259,512 | 32,594,363 | 31,287,949 | 28,923,351 |
| Company Name | Market Share | Total Dosage Units | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Cardinal Health | 21.46% | 56,478,170 | 5,230,466 | 5,797,309 | 6,482,471 | 7,773,419 | 6,965,901 | 5,492,320 | 5,388,940 | 6,125,719 | 7,221,625 | |
| McKesson Corporation | 21.44% | 56,430,209 | 3,408,414 | 4,401,775 | 5,855,183 | 6,201,152 | 4,880,650 | 6,108,391 | 6,541,002 | 9,144,992 | 9,888,650 | |
| AmerisourceBergen Drug | 21.19% | 55,775,794 | 5,449,339 | 6,038,438 | 4,727,170 | 4,445,115 | 6,869,316 | 7,881,370 | 7,831,322 | 6,544,288 | 5,989,436 | |
| Walgreen Co | 13.70% | 36,069,760 | 3,438,905 | 3,895,230 | 4,404,970 | 5,141,710 | 5,561,665 | 5,708,145 | 4,991,405 | 2,424,840 | 502,890 | |
| CVS | 9.04% | 23,802,420 | 1,985,120 | 2,510,500 | 2,562,500 | 2,967,600 | 2,941,600 | 3,114,000 | 3,031,600 | 2,784,700 | 1,904,800 | |
| HBC Service Company | 3.54% | 9,316,960 | 0 | 0 | 0 | 264,380 | 1,745,420 | 2,091,450 | 2,076,320 | 1,863,890 | 1,275,500 | |
| Rite Aid | 3.22% | 8,485,870 | 1,293,600 | 1,510,400 | 1,528,840 | 911,180 | 25,400 | 1,004,010 | 917,840 | 842,110 | 452,490 | |
| Wal-Mart | 2.05% | 5,391,170 | 474,320 | 588,435 | 659,675 | 694,805 | 677,185 | 652,785 | 547,405 | 480,620 | 615,940 | |
| Discount Drug Mart | 1.31% | 3,441,010 | 302,700 | 360,500 | 373,230 | 419,930 | 417,260 | 407,600 | 382,270 | 382,300 | 395,220 | |
| Miami-Luken | 1.08% | 2,848,475 | 177,775 | 226,170 | 248,570 | 315,035 | 400,755 | 360,450 | 407,740 | 341,310 | 370,670 | |
| Eckerd Corporation | 0.90% | 2,372,920 | 0 | 0 | 0 | 408,900 | 1,271,010 | 213,970 | 176,740 | 148,230 | 154,070 | |
| Anda, Inc | 0.67% | 1,758,265 | 589,335 | 495,515 | 46,000 | 94,140 | 59,115 | 143,410 | 206,450 | 86,800 | 37,500 | |
| Auburn Pharmaceutical | 0.08% | 209,960 | 59,000 | 1,500 | 11,960 | 9,100 | 8,770 | 18,910 | 16,260 | 48,000 | 36,460 | |
| The Harvard Drug Group | 0.05% | 131,600 | 100 | 24,100 | 28,680 | 68,620 | 4,600 | 700 | 4,600 | 200 | 0 | |
| River City Pharma | 0.04% | 94,990 | 0 | 1,000 | 0 | 23,400 | 500 | 7,300 | 6,500 | 24,900 | 31,390 | |
| American Sales Company | 0.03% | 87,600 | 87,600 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Henry Schein Inc | 0.03% | 81,170 | 16,000 | 18,000 | 13,700 | 9,700 | 5,355 | 4,255 | 4,795 | 4,945 | 4,420 | |
| H. D. Smith | 0.03% | 68,145 | 0 | 0 | 0 | 0 | 11,140 | 23,405 | 33,100 | 0 | 500 | |
| PD-Rx Pharmaceuticals Inc | 0.02% | 55,304 | 11,990 | 16,309 | 20,380 | 6,400 | 0 | 0 | 0 | 225 | 0 | |
| Associated Pharmacies Inc | 0.01% | 37,600 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19,900 | 17,700 | |
| Almac Clinical Services, Inc. | 0.01% | 25,390 | 1,080 | 0 | 0 | 0 | 3,740 | 8,020 | 9,500 | 2,310 | 740 | |
| Pharmacy Service Ctr Distr | 0.01% | 21,205 | 2,305 | 3,300 | 1,400 | 1,100 | 2,800 | 3,200 | 3,000 | 2,800 | 1,300 | |
| Prescription Supply Inc | 0.01% | 19,300 | 400 | 0 | 0 | 10,000 | 1,000 | 300 | 2,300 | 4,700 | 600 | |
| DRx Pharmaceutical Consultants, Inc. | 0.01% | 18,134 | 9,622 | 4,864 | 3,120 | 528 | 0 | 0 | 0 | 0 | 0 | |
| KeySource Medical | 0.01% | 16,490 | 0 | 0 | 1,880 | 5,275 | 8,320 | 1,015 | 0 | 0 | 0 | |
| Diamond Pharmacy Services | 0.01% | 14,610 | 0 | 0 | 2,190 | 5,220 | 2,430 | 1,680 | 1,590 | 870 | 630 | |
| Independent Pharmacy Cooperative | 0.01% | 13,910 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13,910 | |
| Omnicare Distribution Center LLC | 0.01% | 13,600 | 600 | 100 | 1,400 | 1,200 | 700 | 2,800 | 3,100 | 2,600 | 1,100 | |
| MWI Veterinary Supply | 0.00% | 11,130 | 1,400 | 1,100 | 0 | 500 | 1,320 | 2,205 | 2,935 | 910 | 760 | |
| Darby Dental Supply, LLC | 0.00% | 8,800 | 1,300 | 1,200 | 600 | 1,500 | 1,100 | 1,000 | 700 | 800 | 600 | |
| Rochester Drug Co-Operative Inc | 0.00% | 8,235 | 100 | 120 | 965 | 5,050 | 0 | 2,000 | 0 | 0 | 0 | |
| Columbus Serum Co | 0.00% | 7,100 | 2,800 | 4,000 | 0 | 200 | 100 | 0 | 0 | 0 | 0 | |
| Moore Medical LLC | 0.00% | 6,700 | 300 | 200 | 100 | 1,100 | 1,300 | 1,100 | 1,100 | 1,000 | 500 | |
| Amatheon Inc | 0.00% | 5,780 | 0 | 0 | 225 | 2,070 | 870 | 505 | 635 | 645 | 830 | |
| Patterson Logistics Services | 0.00% | 5,435 | 0 | 0 | 0 | 0 | 300 | 1,200 | 700 | 1,715 | 1,520 | |
| Fisher Clinical Services Inc | 0.00% | 4,624 | 3,360 | 120 | 0 | 1,144 | 0 | 0 | 0 | 0 | 0 | |
| Dispensing Solutions | 0.00% | 4,440 | 0 | 0 | 1,080 | 648 | 1,200 | 1,056 | 456 | 0 | 0 | |
| JOM Pharmaceutical Services, Inc. | 0.00% | 3,930 | 0 | 0 | 0 | 0 | 3,930 | 0 | 0 | 0 | 0 | |
| Palmetto State Pharma. | 0.00% | 3,500 | 0 | 3,500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Penn Veterinary Supply | 0.00% | 3,400 | 700 | 200 | 100 | 600 | 100 | 0 | 0 | 600 | 1,100 | |
| PSS World Medical Inc | 0.00% | 3,315 | 435 | 1,505 | 220 | 545 | 390 | 110 | 110 | 0 | 0 | |
| Capital Wholesale Drug & Co | 0.00% | 2,500 | 0 | 0 | 0 | 0 | 0 | 0 | 2,500 | 0 | 0 | |
| Expert-Med | 0.00% | 2,500 | 500 | 2,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |